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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/653,104	09/03/2003	Chin Wen Wang	PO92267	2954

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EXAMINER	
FLANIGAN, ALLEN J	
ART UNIT	**PAPER NUMBER**
3753	

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/653,104	WANG ET AL.	
	Examiner	Art Unit	
	Allen J. Flanigan	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-8* is/are rejected.

7)☒ Claim(s) *5 and 9-11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. in view of Lopatinsky et al.

Ikeda et al. shows a plate shaped heat pipe including a wick structure (wick 50 in Fig. 4, for example) and fins. These fins may be radial or circumferential (Figs. 5, 6). Note also the provision of a fan with a housing atop the heat sink (Fig. 7). Thus, the only feature not shown in Ikeda et al. is the spiral fin arrangement. Lopatinsky et al. expressly teach the equivalence of radial and spiral fins in heat sinks to define outwardly extending channels for air from a fan. The spiral shape conforms more closely with the circulation direction of air blown from a rotary fan and reduces pressure losses: "In the case where the . . . channels 103 are made spiral-like and bent in the direction of rotation of blower 105 (see Fig. 3 and Fig. 4) the airflow is directed to channels 103 without deceleration, which means that there is no loss in airflow speed when it enters channel 103"[1]. Thus, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to form

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[1] Lines 43-48 of column 8 of Lopatinsky et al.

the fins of Ikeda et al. in a spiral arrangement in view of the express teachings of Lopatinsky et al.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. in view of Lopatinsky et al. as applied to claim 1 above, and further in view of Lorenzetti et al.

Please see the comments made in regard to the rejection above. Pin fins are widely known in the art and provide increased surface area compared to plate-like fins. Lopatinsky et al. indicate that the spirally formed fins may be provided in the form of pin fins (Fig. 6) made by saw cuts. Another known means of forming fins on heat sinks is casting, as shown in Lorenzetti et al. When casting, it is known to form a "draft angle" on protrusions so that they can be easily removed from the mold. Thus, the molded pin fins of Lorenzetti et al. are essentially conical in shape for this reason. It would have been obvious to one of ordinary skill in the art at the time the instant invention was made to form pin fins in a spiral shape as taught in Lopatinsky et al. on the heat sink of Ikeda et al., and to form them in a conical shape to permit forming them using casting as taught in Lorenzetti et al.

Claims 5 and 9-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prasher et al. show a planar heat pipe heat sink with fins ; Budelman and Mira show spiral fins with a fan-cooled heat sink.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen J. Flanigan whose telephone number is (703) 308-1015. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Scherbel can be reached on (703) 308-1272. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Allen J. Flanigan
Primary Examiner
Art Unit 3753

AJF